Research Paper Review

Posterolateral Rotary Instability of the Elbow

American Journal of Sports Medicine 2014; 42: 485-491

Anakwenze OA, Kancherla VK, Iyengar J et al.

ABSTRACT

Symptomatic posterolateral rotatory instability (PLRI) results from a lateral collateral ligament complex injury and presents with pain, clicking, and subluxation within the flexion and extension arcs of elbow motion. Often, symptoms and examination characteristics are subtle and can be easily misdiagnosed. Therefore, a thorough history and provocative physical examination maneuvers are important to correctly establish the diagnosis. Patients frequently have a history of elbow trauma such as an episode(s) of elbow dislocation, prior surgery, or previous cortisone injections. Radiographs and advanced imaging can aid in the diagnosis, and examination under anesthesia, manipulation with arthroscopic visualization, and/or stress radiographs can be confirmatory. Symptomatic cases of PLRI can be effectively treated with a repair or isometric ligament reconstruction.

ANALYSIS

Reviewed by Joseph Brence DC (Research Review Service)

Author's Affiliations

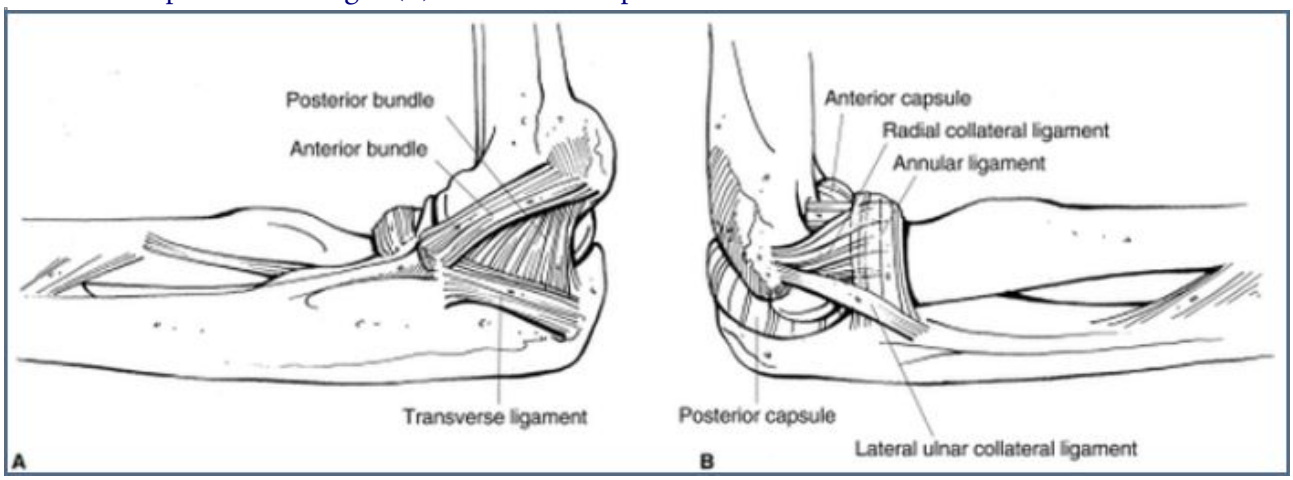
Department of Orthopaedic Surgery, Center for Shoulder, Elbow, and Sports Medicine, Columbia University, New York; Presbyterian/Columbia University Medical Center, New York; Department of Orthopaedic Surgery, St Luke's University Health Network, Pennsylvania.

Background Information

Posterolateral rotary instability (PLRI) of the elbow can result in pain and discomfort, along with the

sensation of elbow locking, snapping, popping and/or slipping. PLRI was originally described to occur secondary to an injury to the lateral ulnar collateral ligament (LUCL), resulting in a rotary subluxation of the ulna on the humerus, with posterior and valgus displacement.

The LUCL typically originates from the lateral epicondyle of the humerus, and blends with fibers of the annular ligament, inserting at the tubercle on the crest of the supinator (on the ulna). The LUCL is part of a Y-shaped, lateral ligament complex (LLC), also comprised of the radial collateral ligament (RCL), annular ligament, and accessory lateral collateral ligament (LCL). In the image below – the left (A) is the medial aspect and the right (B) is the lateral aspect of the elbow.



This complex as a whole contributes to elbow stability, and disruption of LUCL alone does not appear to cause PLRI. Instead, PLRI occurs due to a disruption of the LLC. There is very little research on the conservative management of this condition, with most evidence suggesting surgery, when symptoms persist, followed by a period of immobilization and physical therapy. Manual medicine providers should be aware of this condition to facilitate appropriate referral and patient management.

OVERVIEW OF PLRI OF THE ELBOW

Pathogenesis

- The LLC includes several structures (LUCL, radial collateral ligament [RCL], annular ligament, and accessory lateral collateral ligament [LCL]), that when injured, can result in PLRI.
- This condition often involves avulsion of the LCL that is trauma-induced – often during a fall on out-stretched hand (FOOSH), with the mechanism of injury being axial compression, valgus force and supination (1).
- Other causes of injury to the LCL complex include chronic cubitus varus, sequelae of steroid injections for lateral epicondylitis, and/or connective tissue disease.

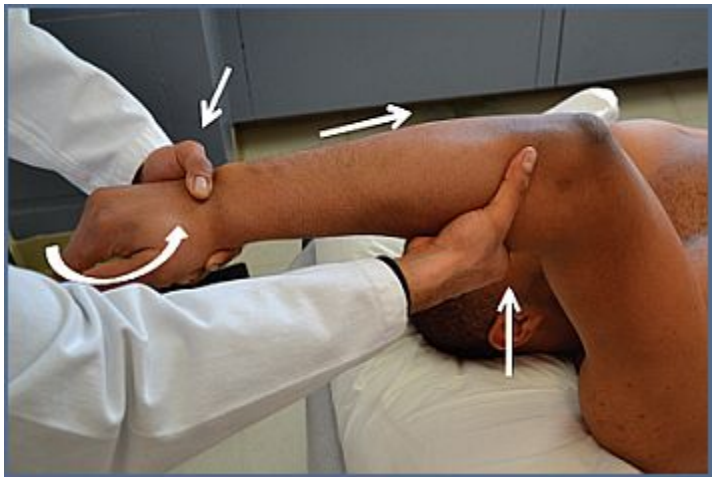
Clinical Presentation

- Patients may present with lateral elbow pain, clicking, locking, snapping or slipping, as well as potential subluxation during flexion/extension motion arcs.
- The patient may have a history is laxity or hypermobility in other joints.

- Symptoms can be subtle and are often misdiagnosed.

Clinical Examination

- Patients should be examined for generalize joint hyperlaxity.
- *Lateral Pivot Shift Test (picture below)*: The patient is supine with the potentially affected extremity over the patient's head while the shoulder is in full external rotation. With the forearm fully supinated, the examiner slowly flexes the elbow while applying valgus, supination, and axial compression. At 40 degrees, rotatory displacement is maximized, and a dimple in the skin proximal to the radial head can be seen with further flexion, causing a clunk. A positive test is apprehension.



- *Posterolateral Rotary Drawer Test*: The examiner pulls posteriorly on the lateral aspect of the posterior forearm. A positive test is apprehension or presence of a dimple.
- *Prone Push-Up Test*: The patient pushes off of the floor with elbows flexed at 90 degrees, forearms supinated and arms abducted. A positive test is apprehension or radial head dislocation as the elbow extends.
- *Chair Push-Up Test*: The patient is seated with elbows flexed to 90 degrees, forearms supinated, and arms abducted. A positive test is apprehension or radial head dislocation as the elbow extends while the patient pushes into the chair to rise.
- *Table Top Relocation Test*: The patient presses up on a table using one arm with the forearm supinated. A positive test is apprehension at 40 degrees of elbow flexion which is relieved when the practitioner presses on the radial head.

Diagnosis & Staging of PLRI

- STAGE 1: Subluxation of the elbow in a posterolateral direction
- STAGE 2: Subluxation of the elbow joint with the coronoid perched underneath the trochlea
- STAGE 3: Complete dislocation with the coronoid resting behind the trochlea
- STAGE 3a: Includes a tear of the posterior band of the medial collateral ligament
- STAGE 3b: Includes tearing of the anterior and posterior bands of the medial collateral ligament

Imaging Considerations

- Standard anterior-posterior and lateral radiographs of the affected elbow may demonstrate a slight widening of the ulnohumeral joint (drop sign) or posterior displacement of the radial head relative to the capitellum.
- The degree of injury to the elbow and its soft tissue structures can be assessed by identifying the following abnormalities: bony avulsions, coronoid or radial head fractures, chondral defects, and/or impaction defects in the posterolateral capitellum produced by a dislocated radial head.
- If you suspect PLRI, but the x-ray is negative, an MRI may be ordered. This may be seen as controversial to some, due to questionable reliability in the literature.

Management of PLRI

- There is an absence of research on conservative care for this injury.
- The authors suggest that PLRI, when symptomatic, can be effectively managed with ligamentous repair or reconstruction, open or arthroscopic
- This article suggests following surgery, most patients return to full activity or sport by 4 to 6 months
- When patients with PLRI are asymptomatic, the authors recommend avoidance of activities which cause instability, elbow bracing, application of a sugar tong cast, pain control and/or physical therapy
- The authors cite a very small study indicating a 25% reoccurrence rate following surgery (2).

Post-Surgical Management

The following recommendations were also provided by the authors about post-surgical management, based on their expertise (no citations given for these recommendations):

- The arm should be immobilized in a posterior splint with the elbow in mid- to full pronation and 90° flexion for 1-2 weeks.
- Following the initial immobilization, the elbow can be placed in a neutral position within a hinged elbow brace for 4 to 6 weeks, permitting 30° of extension and 90° of flexion. The patient is to keep brace on at all times but ROM can be gradually permitted. These parameters are increased until full flexion and extension is achieved
- At 3 months, elbow strengthening and ROM exercises are initiated, along with activity-specific protocols.

CLINICAL APPLICATION & CONCLUSIONS

Although not extremely common, evidence-informed clinicians should keep posterolateral rotary instability of the elbow in mind as a differential diagnosis when patients present with lateral elbow pain, clicking, locking, snapping or slipping, as well as potential subluxation during flexion/extension motion arcs.

PLRI of the elbow can be accurately diagnosed through a combination of subjective symptoms,

objective clinical examination and diagnostic imaging. The degree of instability is then staged based upon the degrees of capsuloligamentous disruption. When asymptomatic, PLRI can and should be conservatively managed. When symptomatic, current evidence suggests surgery may be an effective option, with most patients recovering well in 4-6 months.

STUDY METHODS

This was a narrative review of PLRI (level 5 evidence), so no formal study methods were outlined.

STUDY STRENGTHS / WEAKNESSES

Strengths

- There is very limited research to date on PLRI, but this article provided a good review of all aspects of the condition as currently understood.

Weaknesses

- This article was a narrative review, which is considered level 5 evidence.
- Recommendations were provided in several portions of this article, without citing evidence for those recommendations.

Additional References

1. Charalambous CP, Stanley JK. Posterolateral rotatory instability of the elbow. J Bone Joint Surg (Br) 2008; 90: 272-279.
2. Jones KJ, Dodson CC, Osbahr DC et al. The docking technique for lateral ulnar collateral ligament reconstruction: surgical technique and clinical outcomes. J Shoulder Elbow Surg 2012; 21: 389-395.